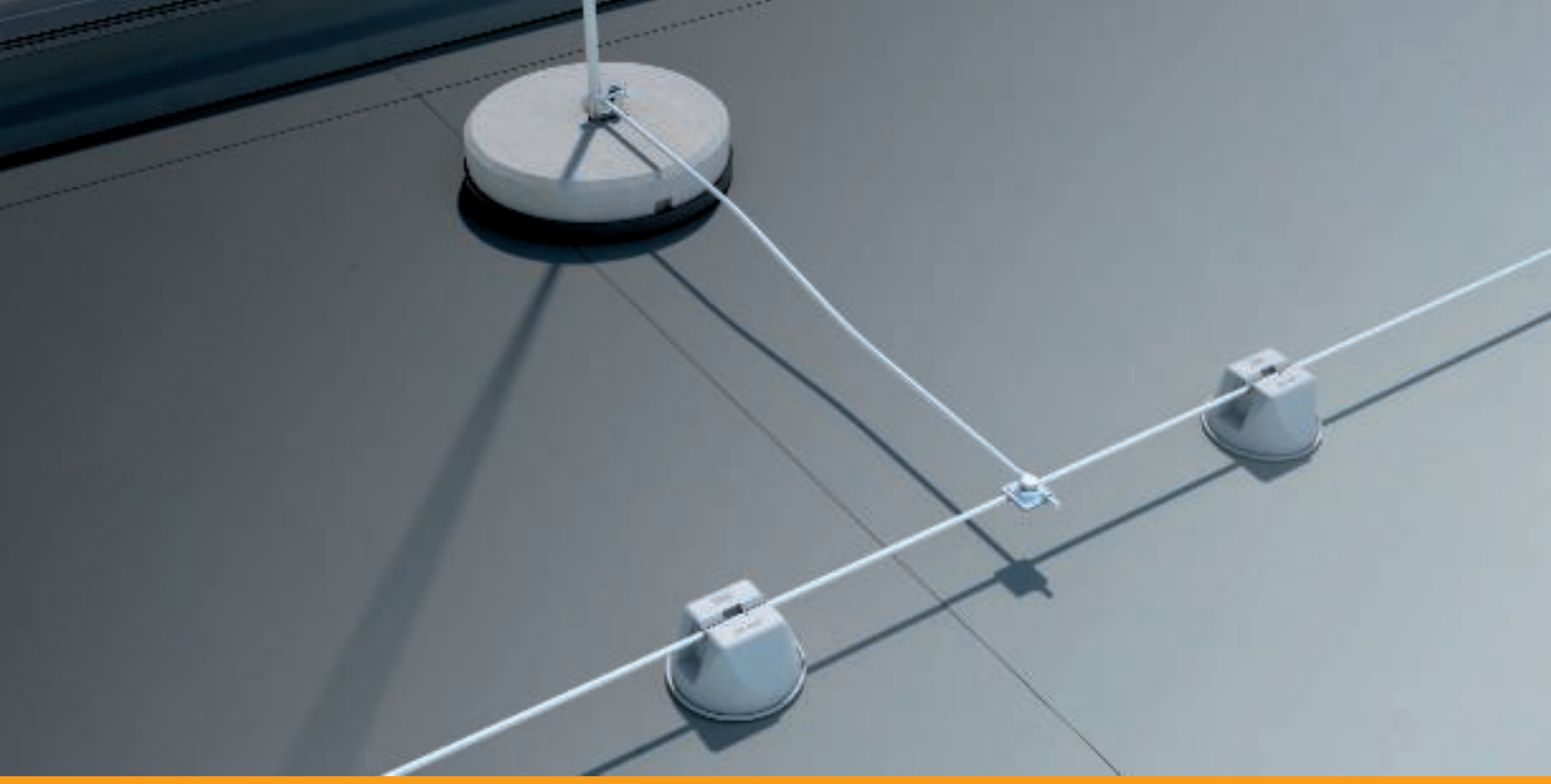
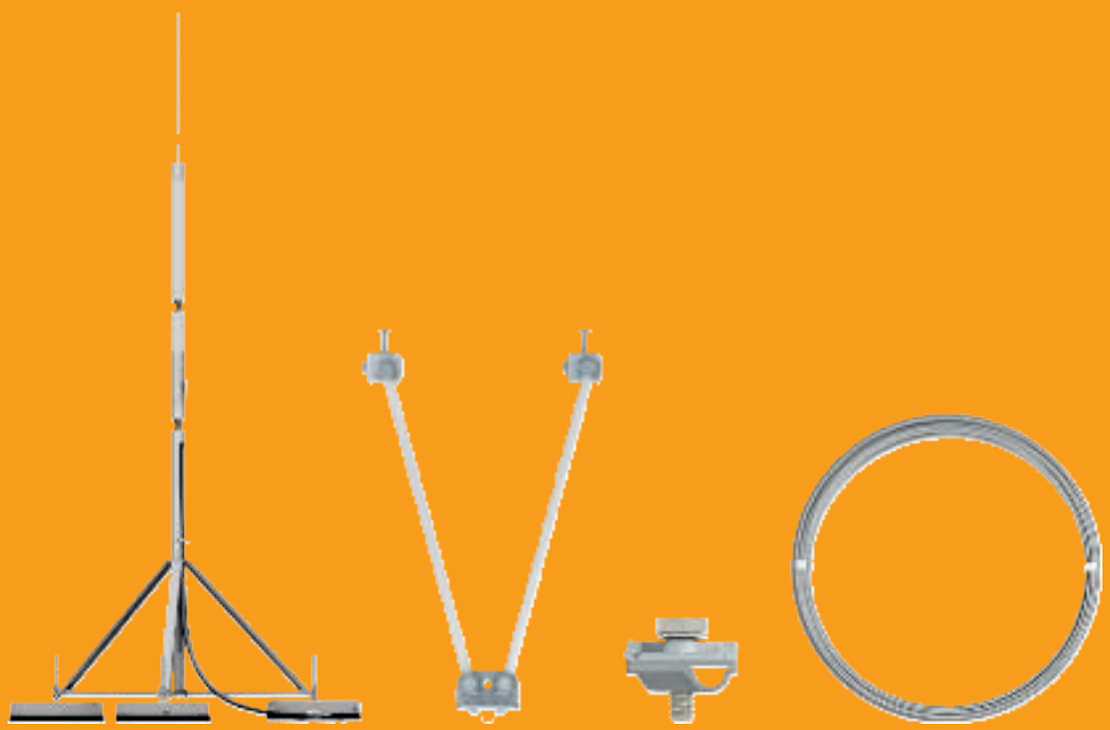


Selection aid, external lightning protection

Components



OBO BETTERMANN

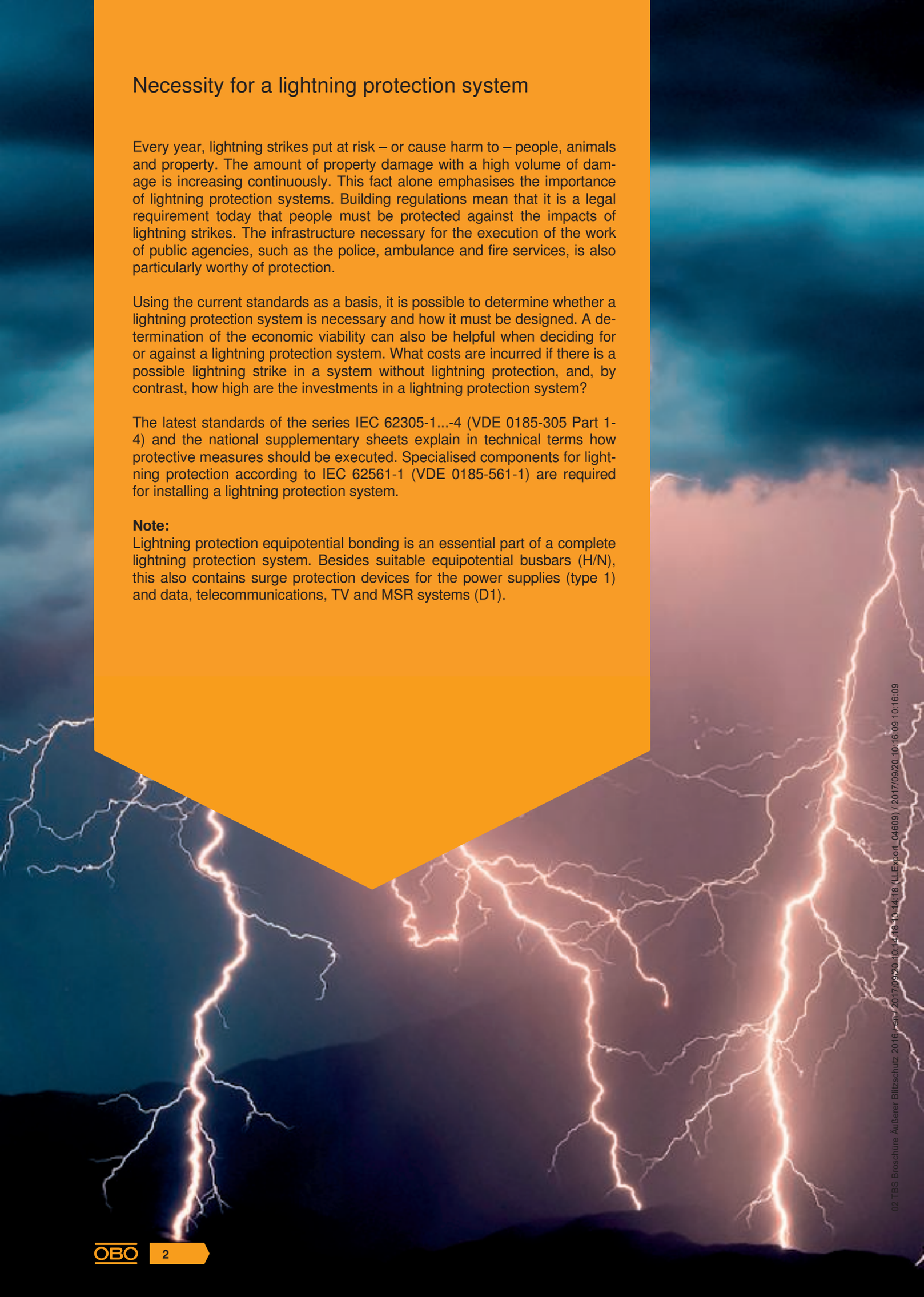
Necessity for a lightning protection system

Every year, lightning strikes put at risk – or cause harm to – people, animals and property. The amount of property damage with a high volume of damage is increasing continuously. This fact alone emphasises the importance of lightning protection systems. Building regulations mean that it is a legal requirement today that people must be protected against the impacts of lightning strikes. The infrastructure necessary for the execution of the work of public agencies, such as the police, ambulance and fire services, is also particularly worthy of protection.

Using the current standards as a basis, it is possible to determine whether a lightning protection system is necessary and how it must be designed. A determination of the economic viability can also be helpful when deciding for or against a lightning protection system. What costs are incurred if there is a possible lightning strike in a system without lightning protection, and, by contrast, how high are the investments in a lightning protection system?

The latest standards of the series IEC 62305-1...-4 (VDE 0185-305 Part 1-4) and the national supplementary sheets explain in technical terms how protective measures should be executed. Specialised components for lightning protection according to IEC 62561-1 (VDE 0185-561-1) are required for installing a lightning protection system.

Note:
Lightning protection equipotential bonding is an essential part of a complete lightning protection system. Besides suitable equipotential busbars (H/N), this also contains surge protection devices for the power supplies (type 1) and data, telecommunications, TV and MSR systems (D1).



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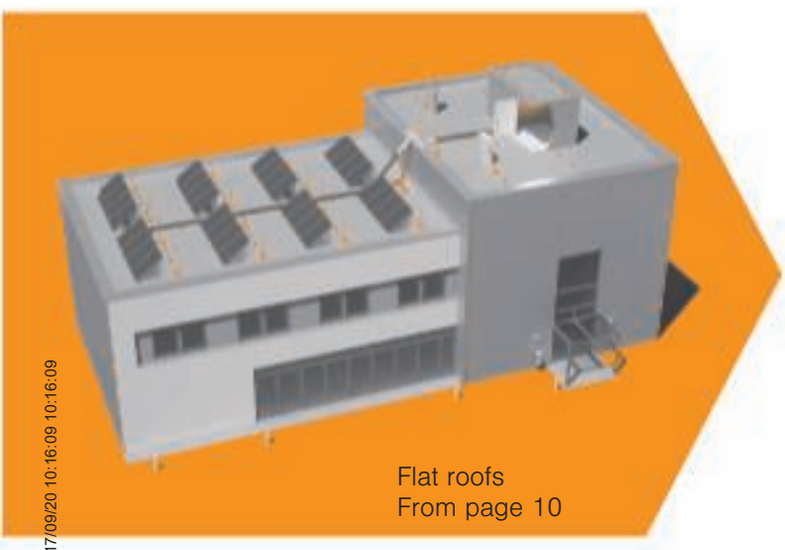

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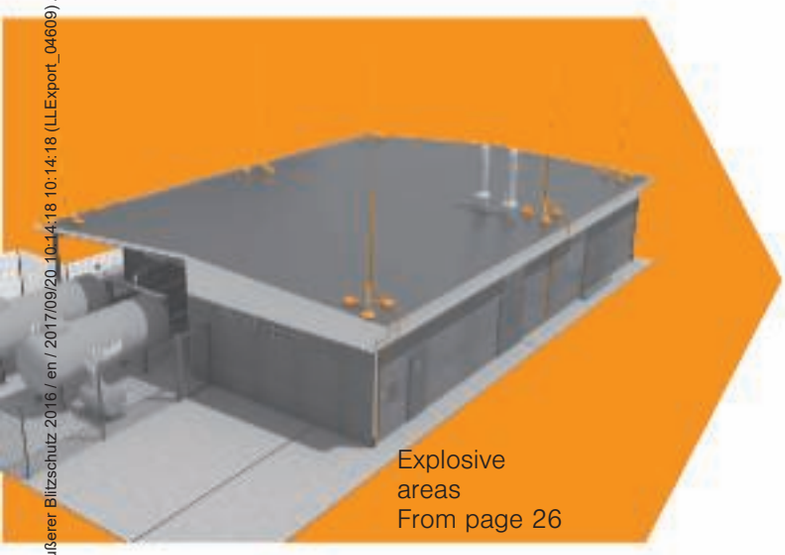

Explosive areas
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Buildings with pitched roof

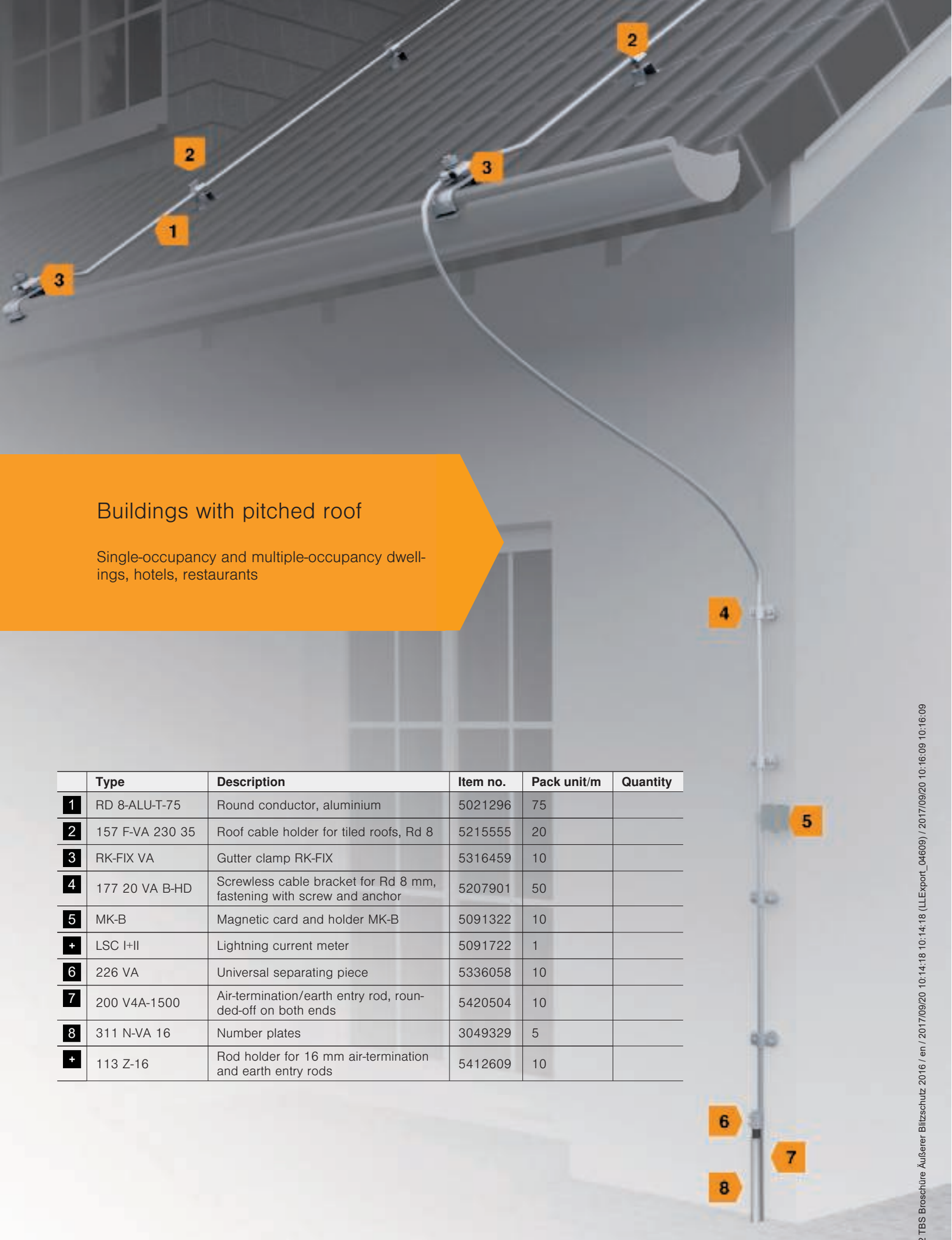
Single-occupancy and multiple-occupancy dwellings, hotels, restaurants

Creation of a lightning protection system

OBO can offer components for comprehensive lightning and surge voltage protection systems. Standard-compliant, tested components from OBO offer protection and safety of the highest order, not just for homes but also for industrial plants and potentially explosive areas.

The external lightning protection system consists of the air-termination system, the conductors and the earthing system. If there is a direct lightning strike, the lightning protection system protects the building against a possible fire. The air-termination systems form protective spaces, the necessary size of which can be determined using, for example, the so-called “rolling sphere method”. The air-termination systems provide optimal impact points which are then connected to the earthing system via the conductors. This creates a conductive path for the lightning currents into the ground, without creating sparks or arcing to other metallic installations.

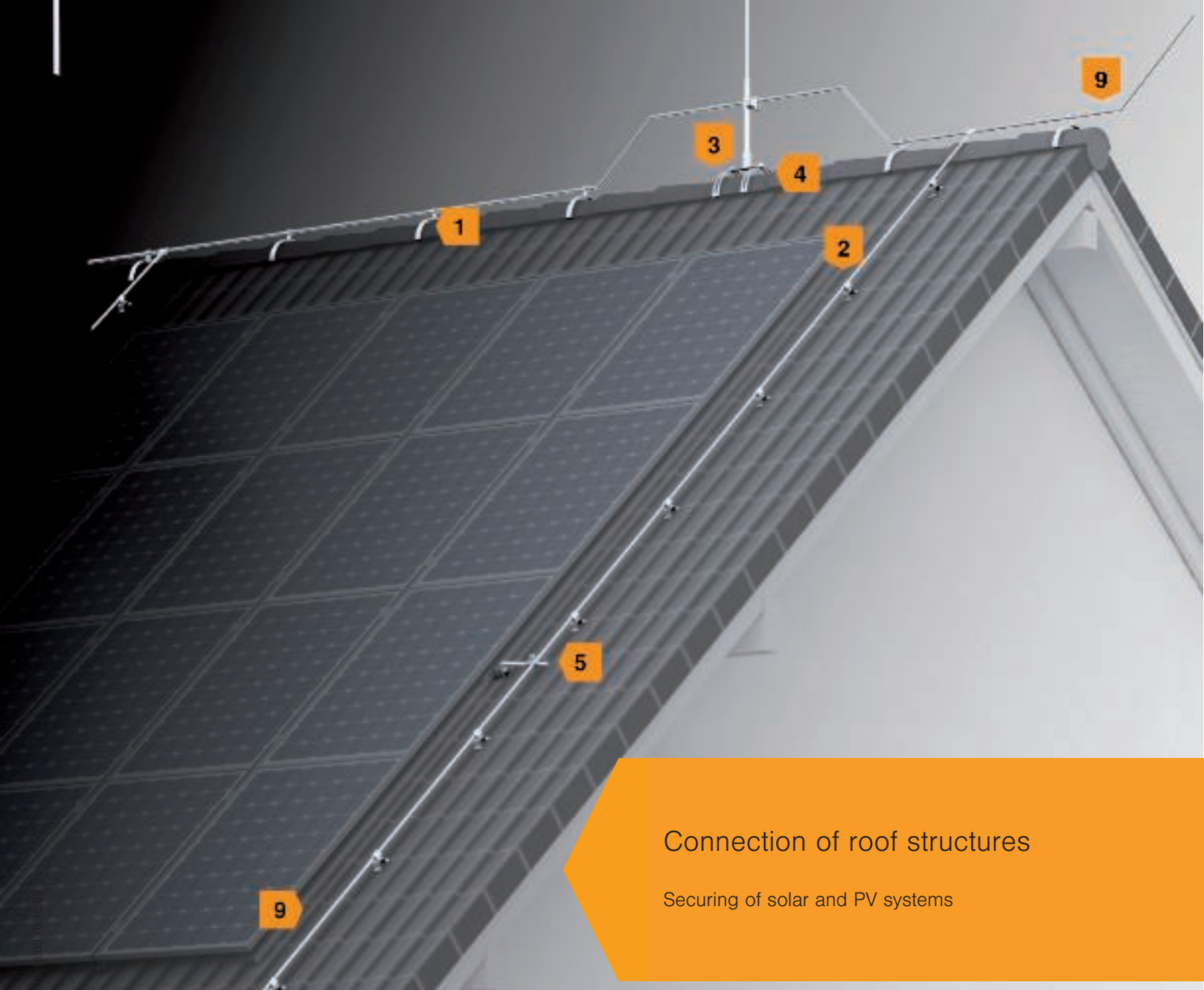
The equipotential bonding system creates the connection into the building.



Buildings with pitched roof

Single-occupancy and multiple-occupancy dwellings, hotels, restaurants

	Type	Description	Item no.	Pack unit/m	Quantity
1	RD 8-ALU-T-75	Round conductor, aluminium	5021296	75	
2	157 F-VA 230 35	Roof cable holder for tiled roofs, Rd 8	5215555	20	
3	RK-FIX VA	Gutter clamp RK-FIX	5316459	10	
4	177 20 VA B-HD	Screwless cable bracket for Rd 8 mm, fastening with screw and anchor	5207901	50	
5	MK-B	Magnetic card and holder MK-B	5091322	10	
+	LSC I+II	Lightning current meter	5091722	1	
6	226 VA	Universal separating piece	5336058	10	
7	200 V4A-1500	Air-termination/earth entry rod, rounded-off on both ends	5420504	10	
8	311 N-VA 16	Number plates	3049329	5	
+	113 Z-16	Rod holder for 16 mm air-termination and earth entry rods	5412609	10	



Connection of roof structures

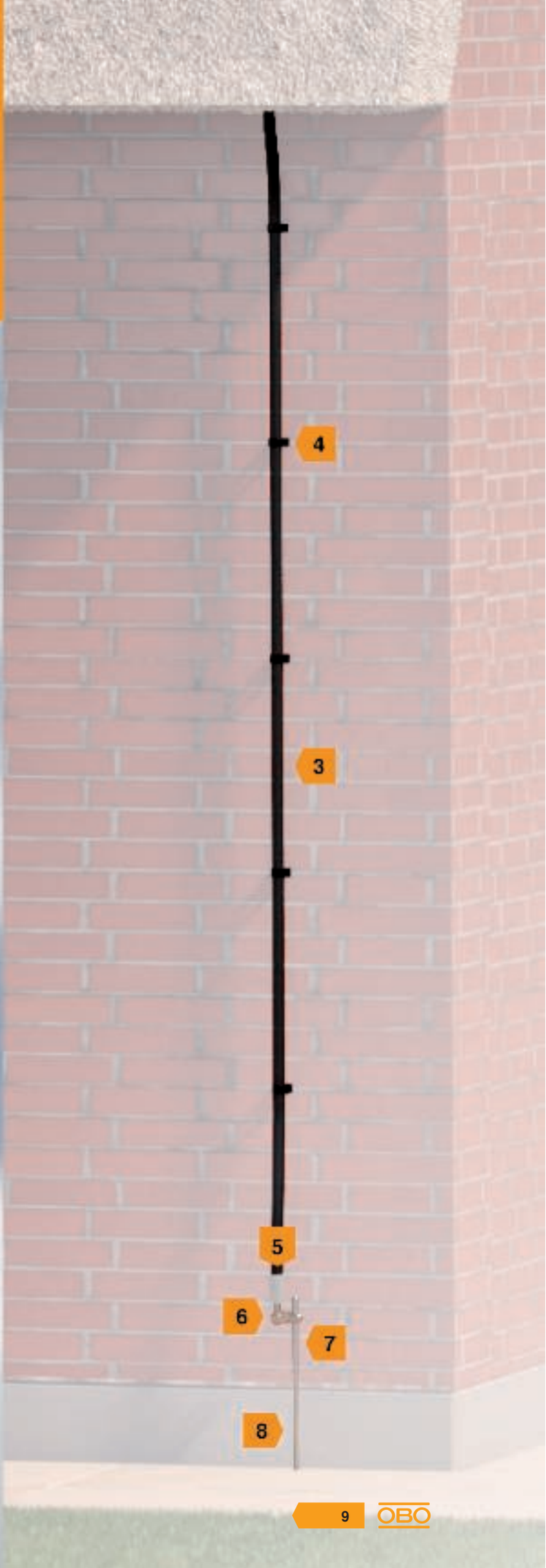
Securing of solar and PV systems

	Type	Description	Item no.	Pack unit/m	Quantity
1	132 VA	Roof cable holder for ridge tiles, 185–260 mm, Rd 8	5202833	20	
2	157 F-VA 230 35	Roof cable holder for tiled roofs, Rd 8	5215555	20	
3	F-Fix-132-300	Air-termination rod holder for ridge tiles	5403333	1	
4	249 8-10X16 VA	Vario quick connector Rd 8-10x16	5311590	10	
5	249 8-10 ALU	Vario quick connector	5311519	30	
6	RK-FIX VA	Gutter clamp RK-FIX	5316459	20	
7	RD 8-ALU-T-75	Round conductor, aluminium	5021296	75	
8	200 V4A-1500	Air-termination/earth entry rod, rounded-off on both ends	5420504	10	
9	Installation information	Length of air-termination rod: approx. 0.15 m Edge spacing: approx. 0.4 m Clip spacing: approx. 0.8-1.0 m			

Architecturally high-quality buildings

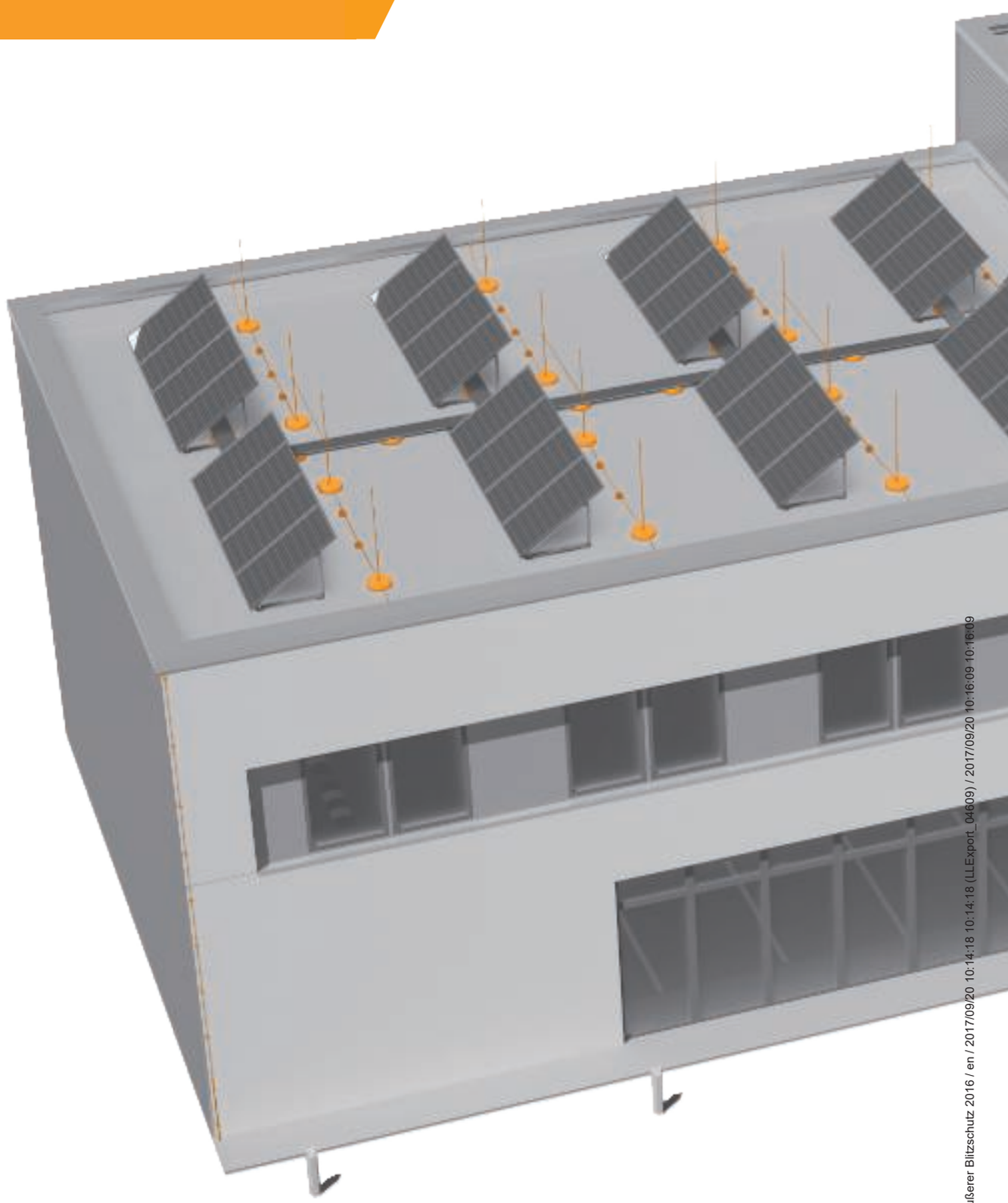
Buildings with thatched roof

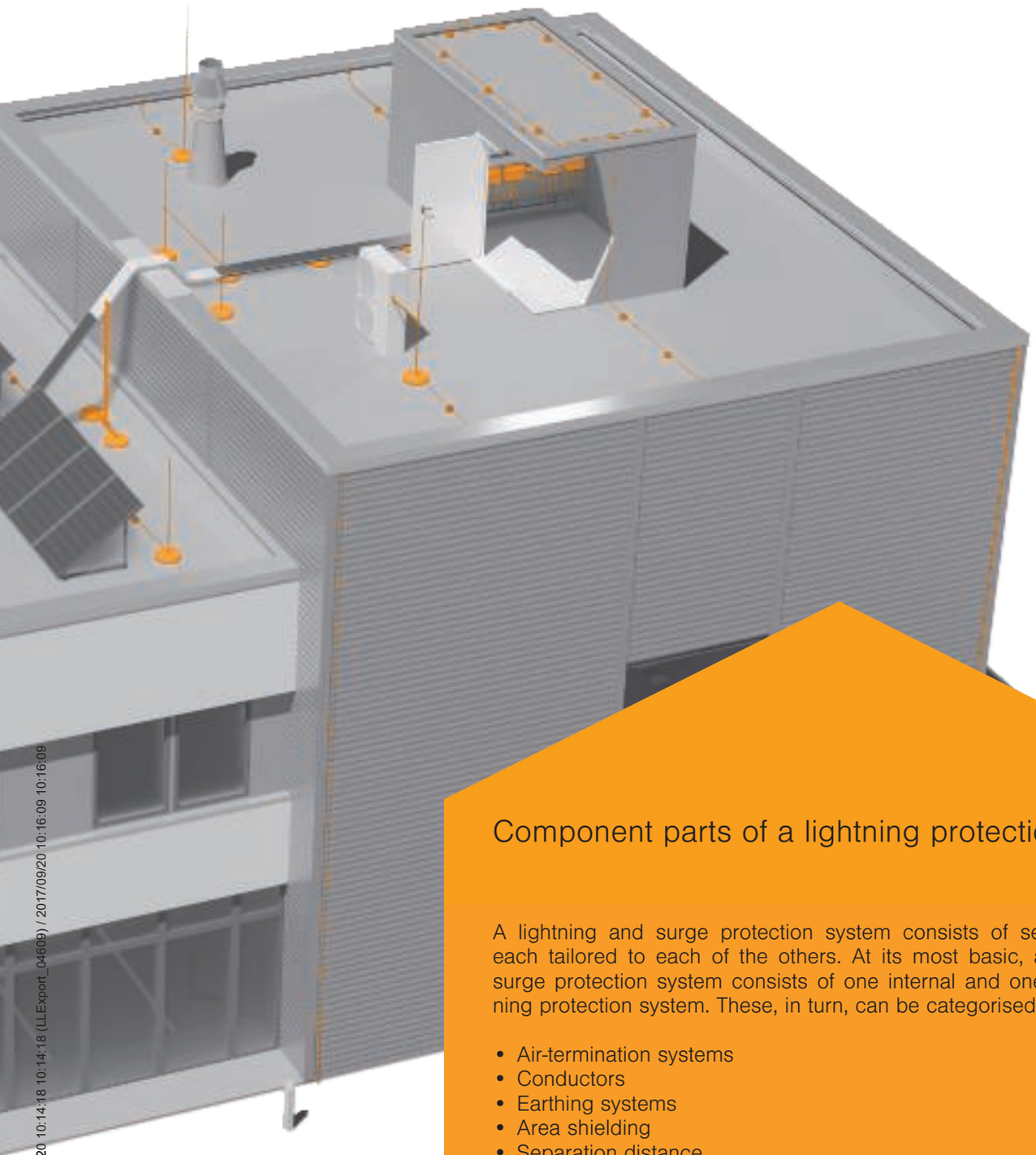
	Type	Description	Item no.	Pack unit/m	Quantity
1	isFang IN 4000	isFang, insulated air-termination rod for inner-routed isCon ® conductor Roof routing, fastening and sealing according to the roof shape	5408934	1	
2	1809	Equipotential busbar with plastic base plate	5015073	1	
3	isCon ® 750 SW		5408002	25	
4	SQ-20 SW-OBO	starQuick cable bracket PA Fastening spacing approx. 0.5-0.8 m	2146164	50	
5	isCon connect	Connection element	5408022	2	
6	223 O DIN ZN	Separating piece, open	5335140	20	
7	311 N-VA 8-10	Number plates	3049221	5	
8	AF RD 10 V4A	Connection lug/earth entry rod made of stainless steel	5430720	5	



Buildings with flat roof

Industrial halls, distribution centres, office buildings, furniture stores





Component parts of a lightning protection system

A lightning and surge protection system consists of several systems, each tailored to each of the others. At its most basic, a lightning and surge protection system consists of one internal and one external lightning protection system. These, in turn, can be categorised as follows:

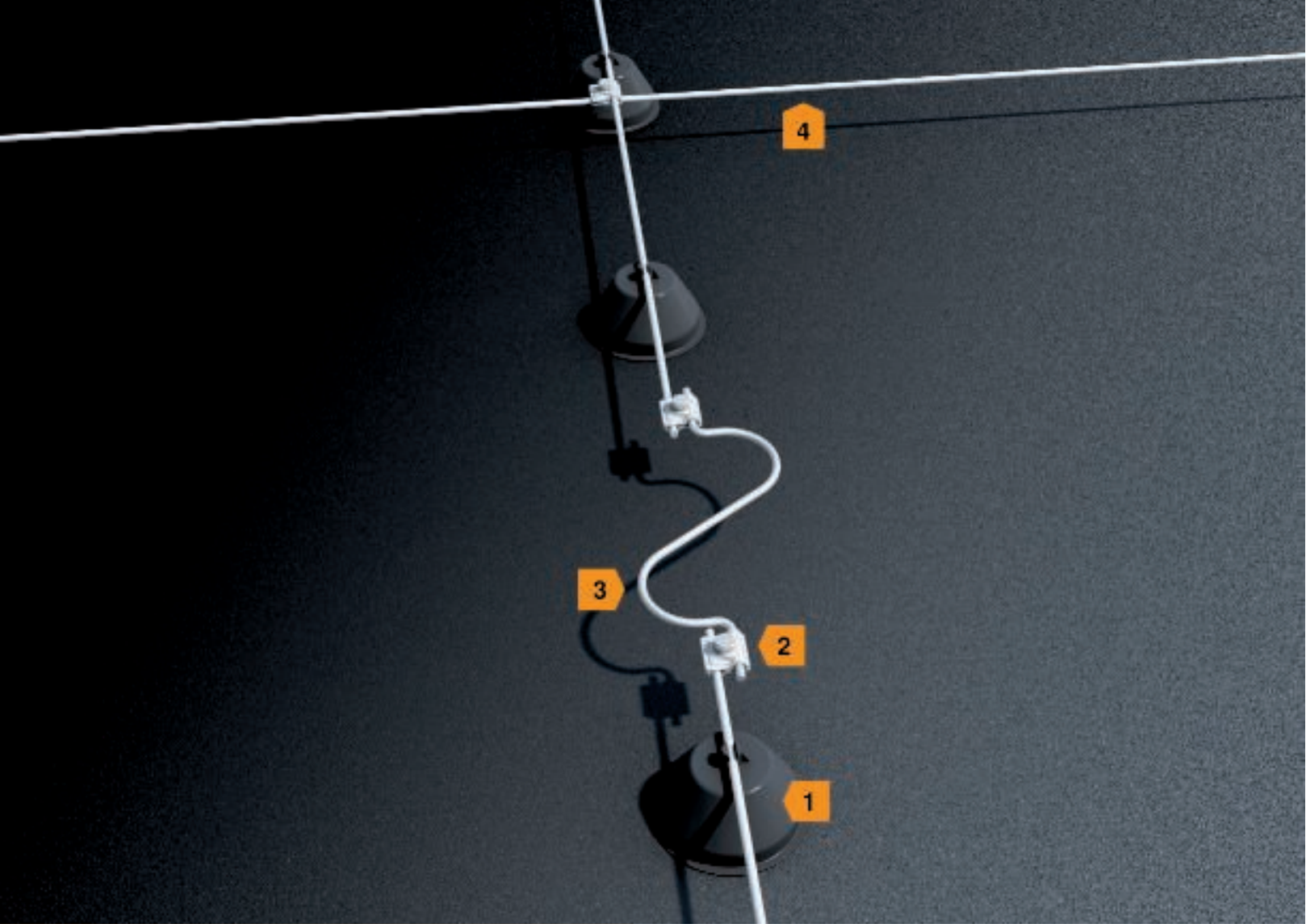
- Air-termination systems
- Conductors
- Earthing systems
- Area shielding
- Separation distance
- Lightning protection equipotential bonding

These systems must be carefully selected for the application at hand, and used in a coordinated way. Installation of the systems takes place according to various application and product standards. The supplements to the international IEC guidelines and harmonised European versions of the various country-specific translations often contain additional informative information specific to the country in question.

Parapet

Connection of natural air-termination and arresting systems

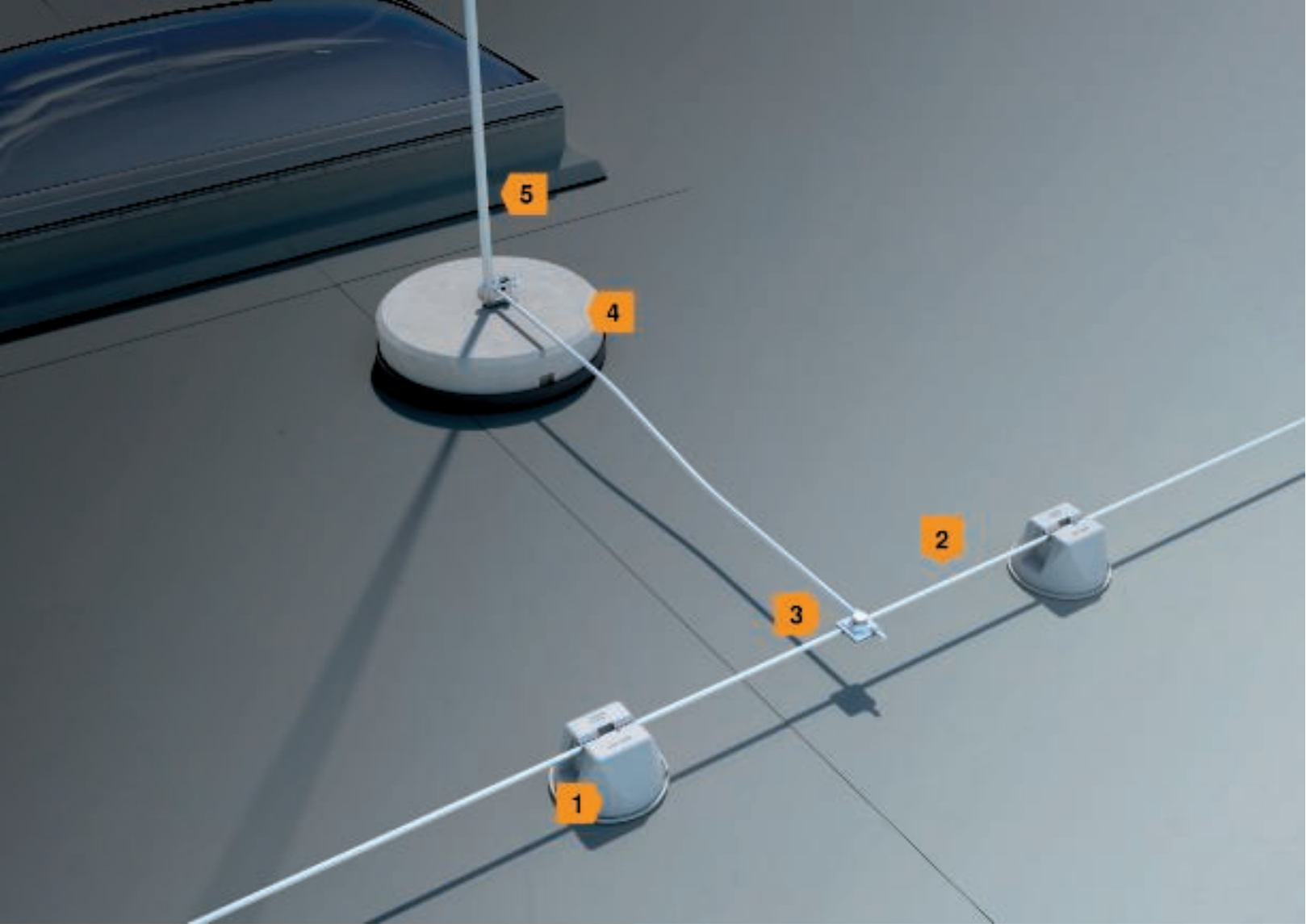
	Type	Description	Item no.	Pack unit/m	Quantity
1	165 MBG-8	Roof cable holder for flat roofs	5218691	12	
2	RD 8-ALU-T-75	Round conductor, aluminium	5021296	15	
3	287 DCT	Connection component with double crossbar	5320707	10	



Flat roof/bitumen

Expansion compensation on flat roofs

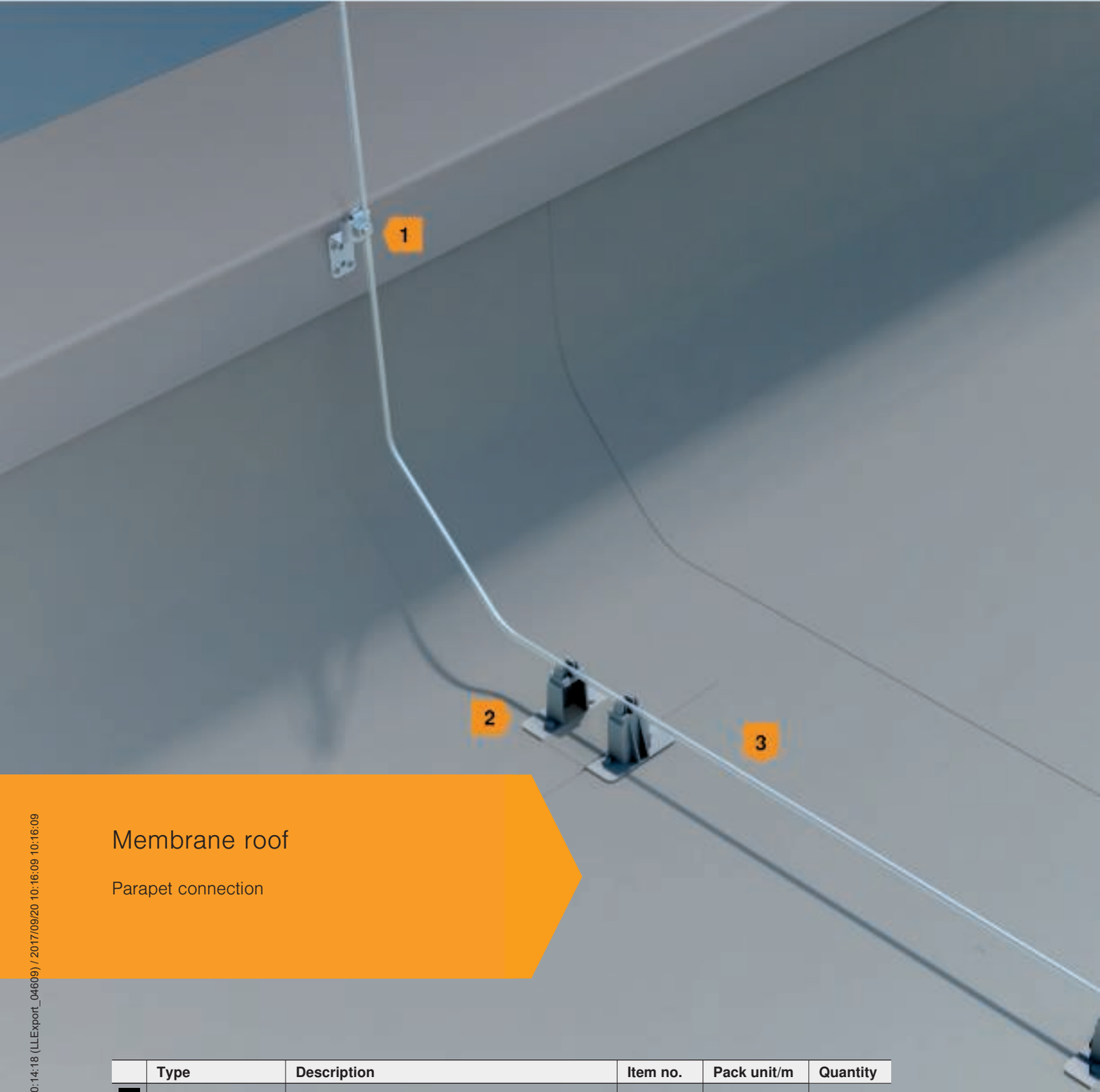
	Type	Description	Item no.	Pack unit/m	Quantity
1	165 KR	Roof cable holder for flat roofs, plastic sleeve	5218861	50	
2	249 8-10 ALU	Vario quick connector	5311519	30	
3	172 AR	Expansion piece	5218926	10	
4	RD 8-ALU	Round conductor, aluminium Expansion compensation for aluminium approx. every 10 m	5021286	150	



Membrane roof

Protection of light domes or RWA systems

	Type	Description	Item no.	Pack unit/m	Quantity
1	MBG-8 GR	Roof cable holder for flat roofs	5218693	12	
2	RD 8-ALU-T 75	Round conductor, aluminium	5021296	75	
3	249 8-10 ALU	Vario quick connector	5311519	30	
4	F-FIX-16	Stand for FangFix system 16 kg	5403200	1	
5	101 VL3000	Tapered pipe air-termination rod	5401989	10	



Membrane roof

Parapet connection

	Type	Description	Item no.	Pack unit/m	Quantity
1	287 DCT	Connection component with double crossbar	5320707	10	
2	165 R-8-10 OBG	Roof cable holder, for plastic film roofs	5218999	100	
3	RD 8-ALU-T	Round conductor, aluminium	5021294	150	

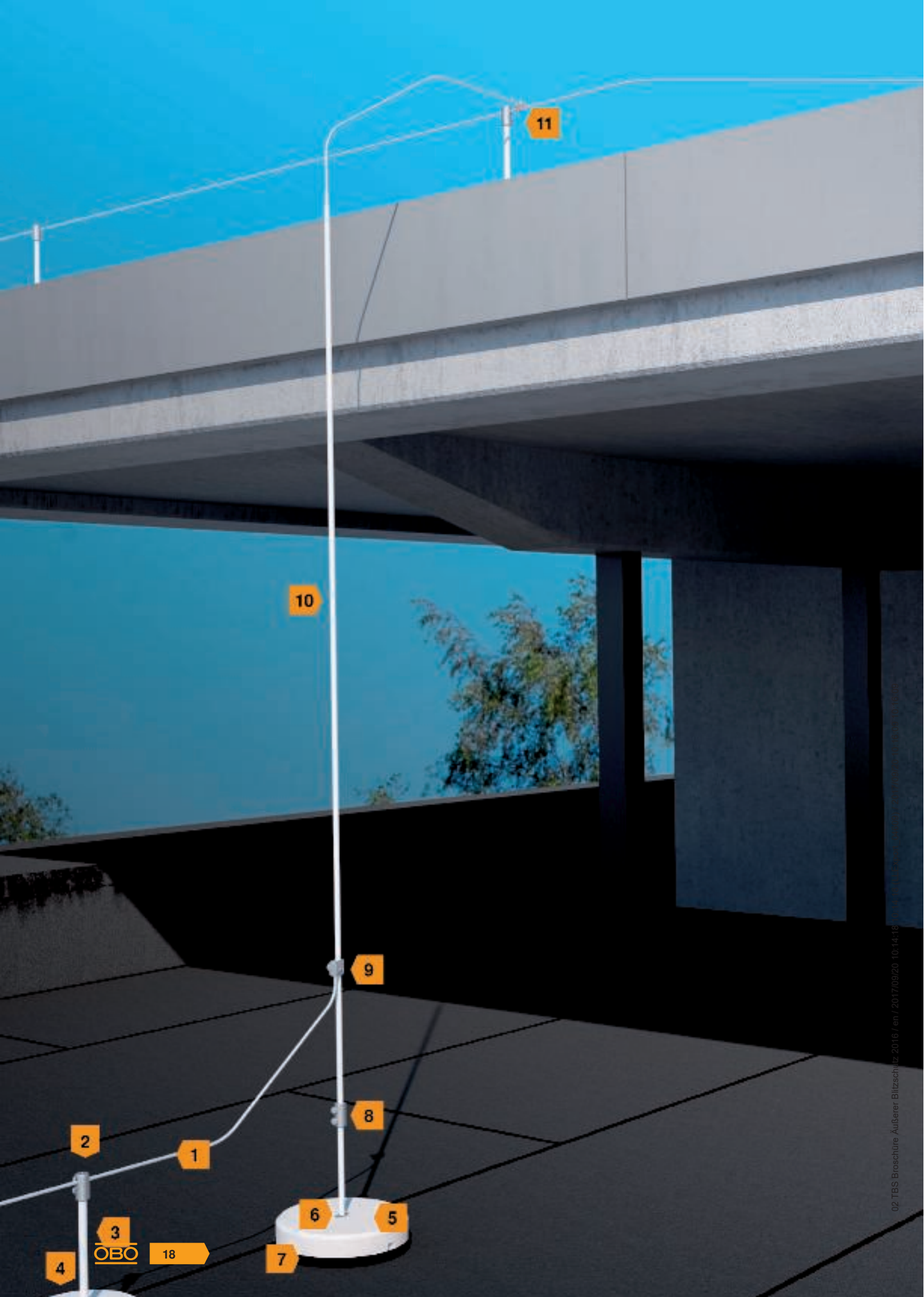
Insulated lightning protection

Insulated sets

	Type	Description	Item no.	Pack unit/m	Quantity
1	101 3-ES-16	Insulated lightning protection set, 3-corner fastening	5408976	1	
2	101 FS-16	Insulated lightning protection set, IR fastening	5408980	1	
3	101 VS-16	Insulated lightning protection set, V fastening	5408978	1	
4	101 VRS-16	Insulated lightning protection set, VRS fastening	5408982	1	
5	RD 8-ALU	Round conductor, aluminium	5021286	150	
+	RD 10-ALU	Round conductor, aluminium	5021308	95	
+	101 VL3000	Tapered pipe air-termination rod	5401989	10	

Insulated lightning protection
Insulation crossbar

	Type	Description	Item no.	Pack unit/m	Quantity
1	165 MBG-8	Roof cable holder for flat roofs, spacing approx. 1 m	5218691	12	
2	F-FIX-10	Stand for FangFix system 10 kg	5403103	1	
3	101 VL3500	Tapered pipe air-termination rod	5101993	10	
4	ISO-A-1030	Insulated spacer	5408820	15	



Insulated lightning protection

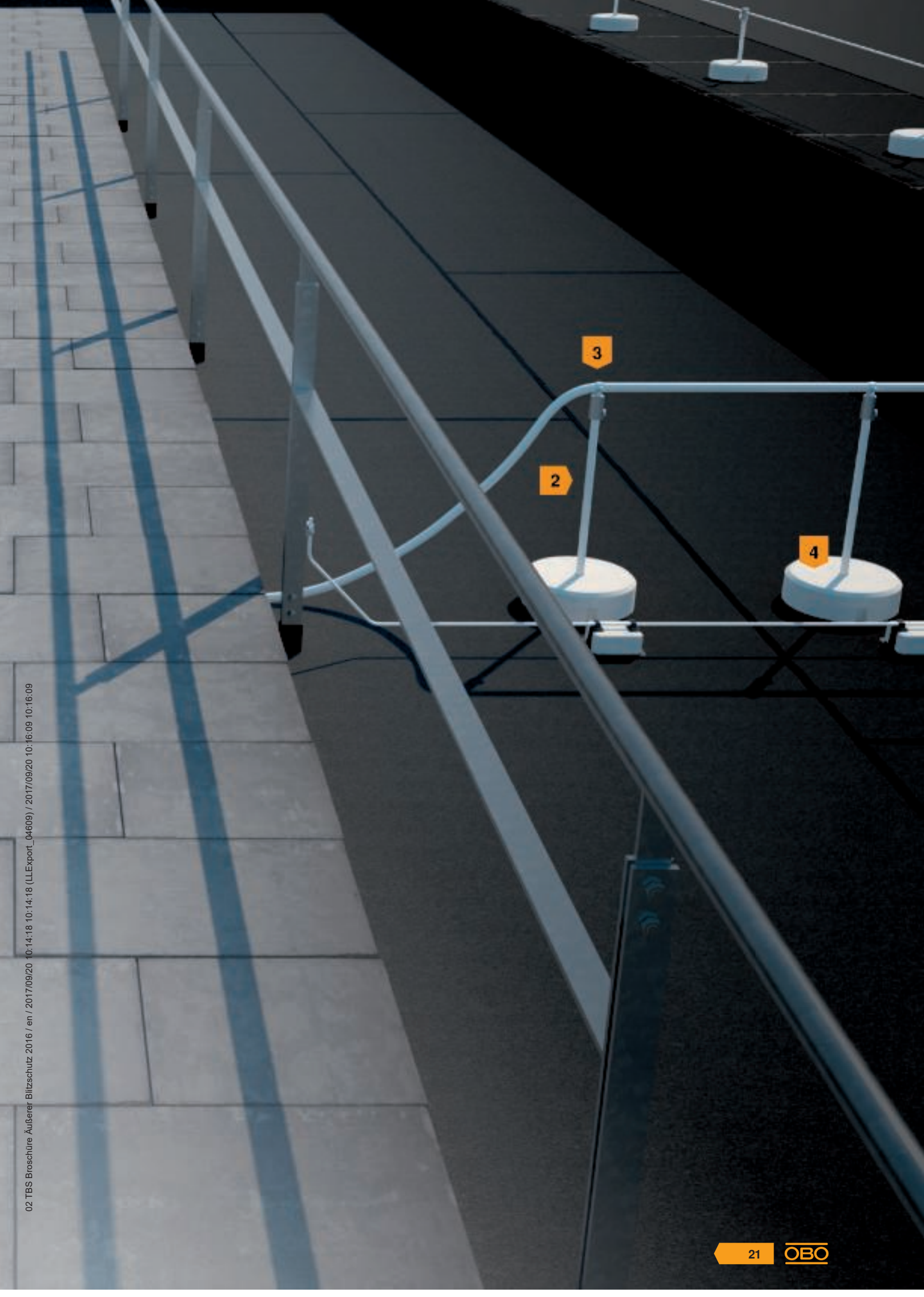
Storey jump

	Type	Description	Item no.	Pack unit/m	Quantity
1	RD 8-ALU-T	Round conductor, aluminium	5021294	150	
2	101 IES-16	End piece	5408395	10	
3	101 16-750	Insulating rod - 750 mm For shortening to variable lengths	5408107	5	
4	F-FIX-S10	Concrete block for FangFix system 10 kg	5403117	1	
+	101 RH-16	FangFix reducing sleeve	5408101	25	
+	F-FIX-B10	Base for FangFix system 10 kg	5403124	10	
5	F-FIX-S16	Concrete block for FangFix system 16 kg	5403227	1	
6	101 RH-16	FangFix reducing sleeve	5408101	25	
7	F-FIX-B16	Basis for FangFix system 16 kg	5403235	10	
8	101 IV-16	Extension	5408557	10	
9	249 8-10X16 VA	Vario quick connector Rd 8-10x16	5311590	10	
10	101 VL2500	Tapered pipe air-termination rod	5401986	10	
11	249 8-10 ALU	Vario quick connector	5311519	30	

High-voltage-resistant, insulated conductor isCon®

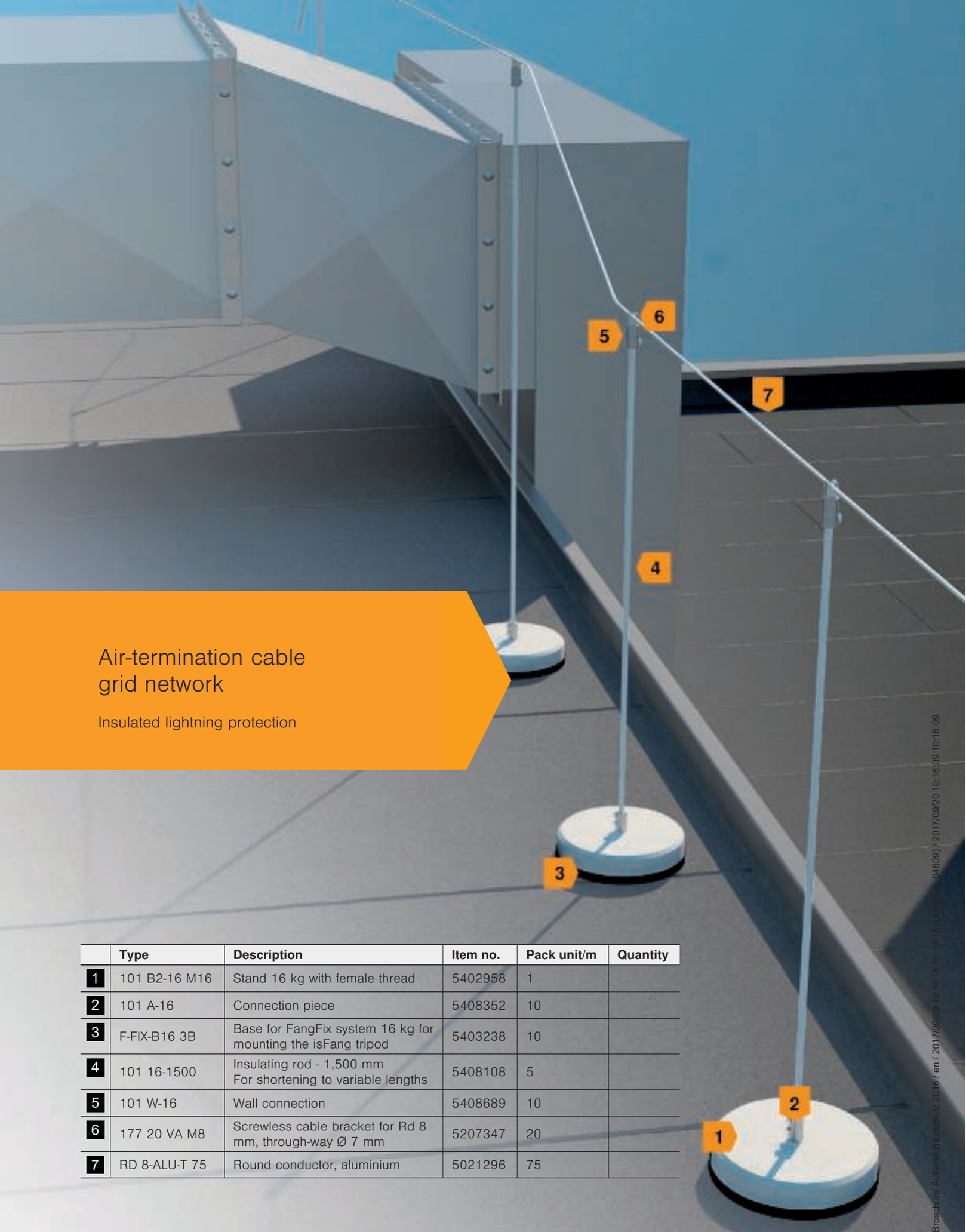
Escape route/accessible flat roof

	Type	Description	Item no.	Pack unit/m	Quantity
1	isCon 750 LGR	isCon ® conductor in light grey	5407995	25	
2	101 20-3000	Insulating rod - 3,000 mm For shortening to variable lengths	5408105	5	
3	101 IW-M10	Wall connection	5408687	10	
+	isCon H 26VA	VA cable bracket	5408064	20	
4	F-FIX-S10	Concrete block for FangFix system 10 kg	5403117	1	
+	F-FIX-B10	Base for FangFix system 10 kg	5403124	10	
5	165 R-8-10	Roof cable holder for flat roofs, recyclable	5218997	10	
6	270 8-10 FT	Folding clamp Rd 8-10 up to 10 mm plate thickness	5317207	20	
7	101 IES-16	End piece	5408395	10	

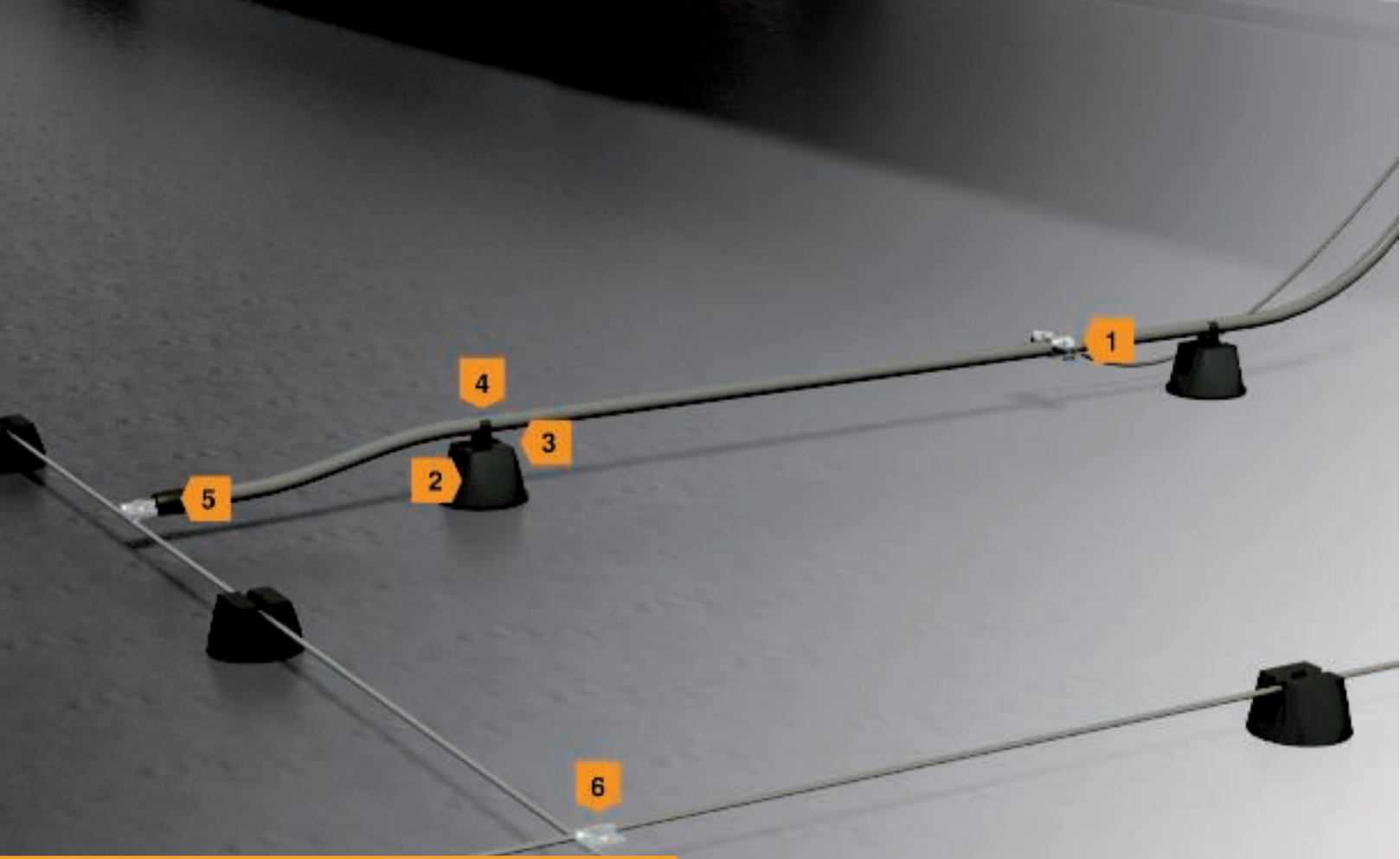


Air-termination cable grid network

Insulated lightning protection



	Type	Description	Item no.	Pack unit/m	Quantity
1	101 B2-16 M16	Stand 16 kg with female thread	5402958	1	
2	101 A-16	Connection piece	5408352	10	
3	F-FIX-B16 3B	Base for FangFix system 16 kg for mounting the isFang tripod	5403238	10	
4	101 16-1500	Insulating rod - 1,500 mm For shortening to variable lengths	5408108	5	
5	101 W-16	Wall connection	5408689	10	
6	177 20 VA M8	Screwless cable bracket for Rd 8 mm, through-way Ø 7 mm	5207347	20	
7	RD 8-ALU-T 75	Round conductor, aluminium	5021296	75	



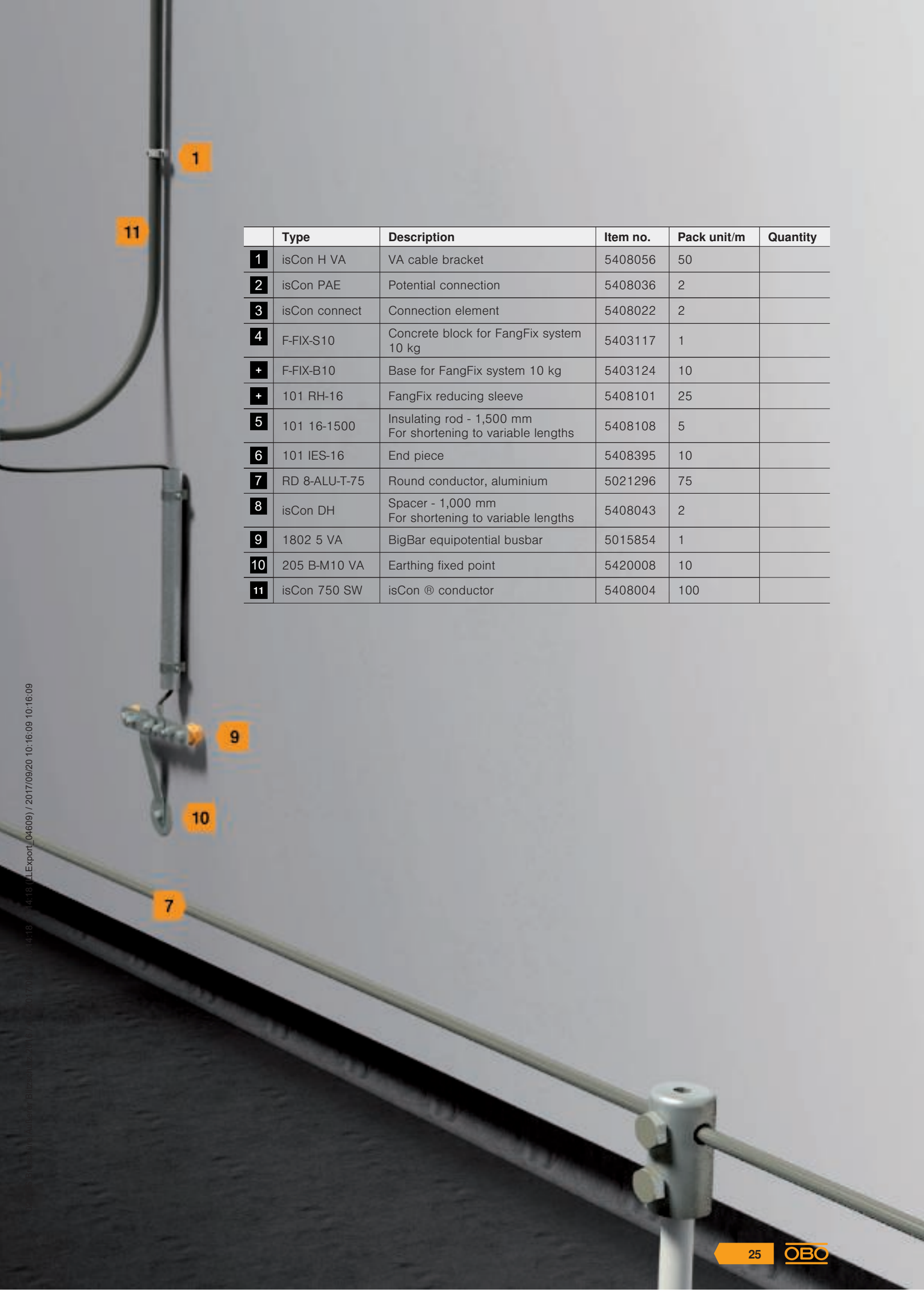
Air-termination cable grid network

Insulated lightning protection

	Type	Description	Item no.	Pack unit/m	Quantity
1	isCon PAE	Potential connection	5408036	2	
2	165 MBG-8	Roof cable holder for flat roofs	5218691	12	
3	165 MBG UH	Universal adapter for roof cable holder, type 165/MBG	5218882	25	
4	M-Quick M25 SW	M-Quick cable bracket PA	2153787	50	
5	isCon connect	Connection element	5408022	2	
6	249 B ALU	Vario quick connector	5311713	100	

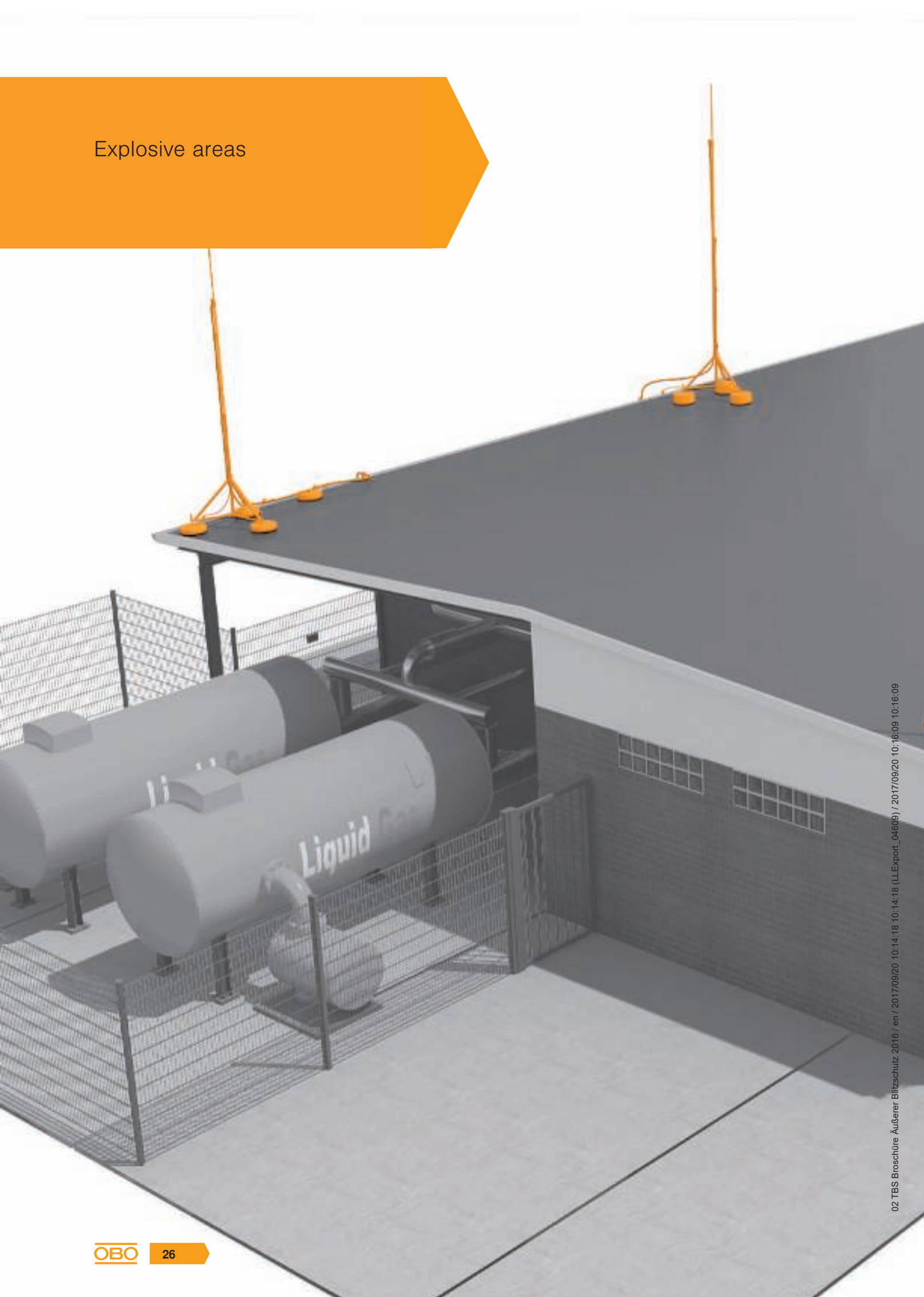
High-voltage-resistant, insulated conductor isCon®

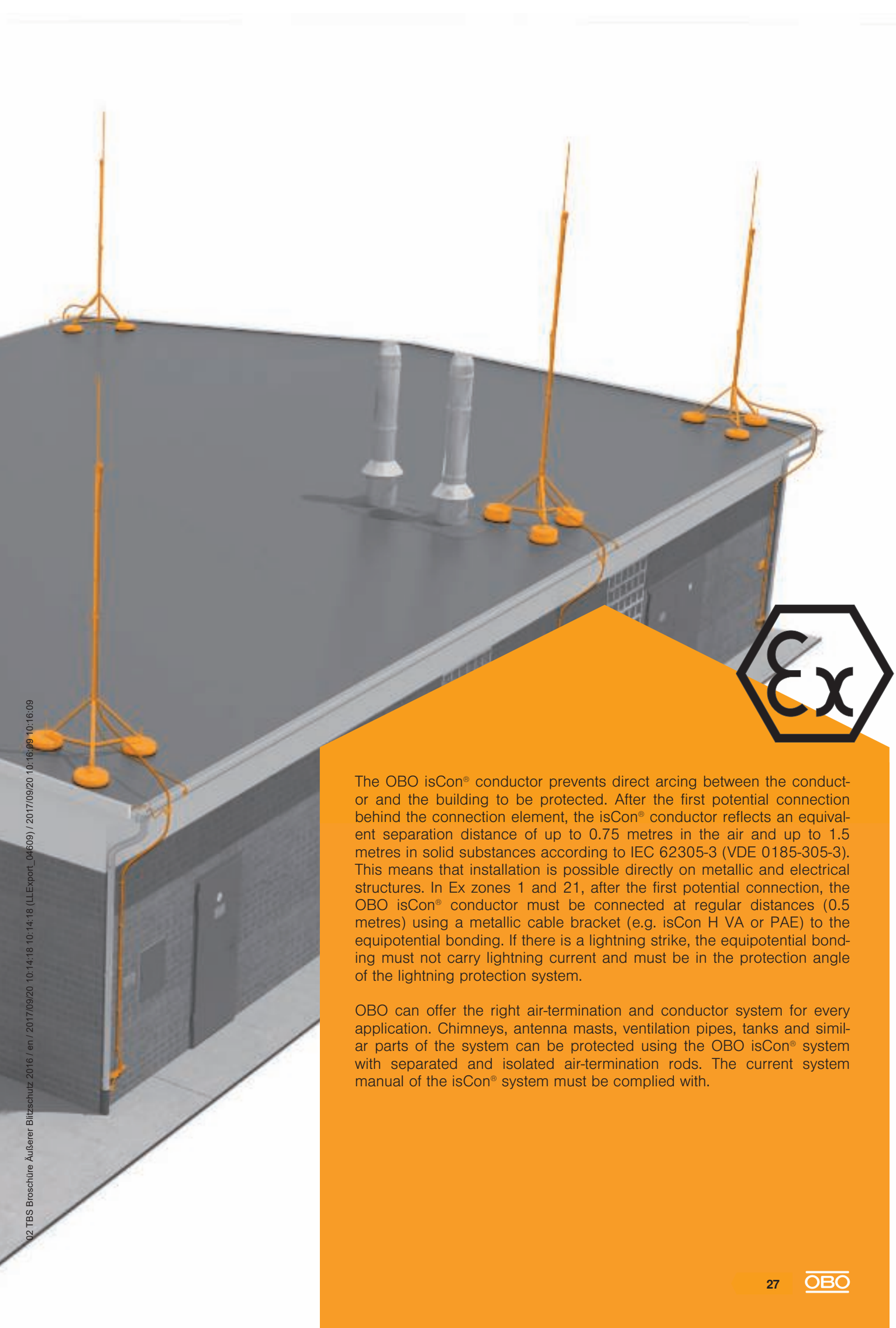
Connection to conventional insulated lightning protection



	Type	Description	Item no.	Pack unit/m	Quantity
1	isCon H VA	VA cable bracket	5408056	50	
2	isCon PAE	Potential connection	5408036	2	
3	isCon connect	Connection element	5408022	2	
4	F-FIX-S10	Concrete block for FangFix system 10 kg	5403117	1	
+	F-FIX-B10	Base for FangFix system 10 kg	5403124	10	
+	101 RH-16	FangFix reducing sleeve	5408101	25	
5	101 16-1500	Insulating rod - 1,500 mm For shortening to variable lengths	5408108	5	
6	101 IES-16	End piece	5408395	10	
7	RD 8-ALU-T-75	Round conductor, aluminium	5021296	75	
8	isCon DH	Spacer - 1,000 mm For shortening to variable lengths	5408043	2	
9	1802 5 VA	BigBar equipotential busbar	5015854	1	
10	205 B-M10 VA	Earthing fixed point	5420008	10	
11	isCon 750 SW	isCon ® conductor	5408004	100	

Explosive areas





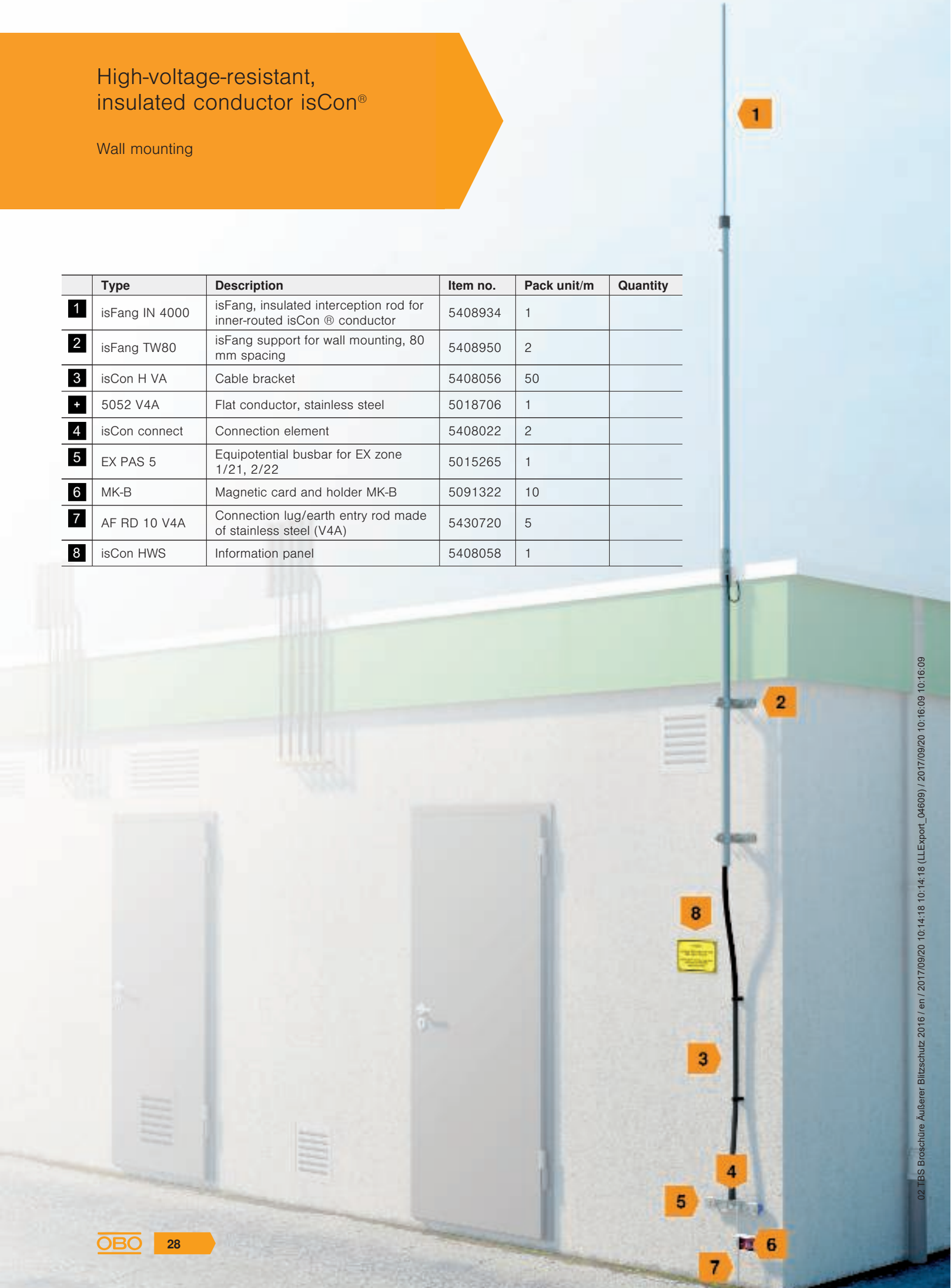
The OBO isCon® conductor prevents direct arcing between the conductor and the building to be protected. After the first potential connection behind the connection element, the isCon® conductor reflects an equivalent separation distance of up to 0.75 metres in the air and up to 1.5 metres in solid substances according to IEC 62305-3 (VDE 0185-305-3). This means that installation is possible directly on metallic and electrical structures. In Ex zones 1 and 21, after the first potential connection, the OBO isCon® conductor must be connected at regular distances (0.5 metres) using a metallic cable bracket (e.g. isCon H VA or PAE) to the equipotential bonding. If there is a lightning strike, the equipotential bonding must not carry lightning current and must be in the protection angle of the lightning protection system.

OBO can offer the right air-termination and conductor system for every application. Chimneys, antenna masts, ventilation pipes, tanks and similar parts of the system can be protected using the OBO isCon® system with separated and isolated air-termination rods. The current system manual of the isCon® system must be complied with.

High-voltage-resistant, insulated conductor isCon®

Wall mounting

	Type	Description	Item no.	Pack unit/m	Quantity
1	isFang IN 4000	isFang, insulated interception rod for inner-routed isCon ® conductor	5408934	1	
2	isFang TW80	isFang support for wall mounting, 80 mm spacing	5408950	2	
3	isCon H VA	Cable bracket	5408056	50	
+	5052 V4A	Flat conductor, stainless steel	5018706	1	
4	isCon connect	Connection element	5408022	2	
5	EX PAS 5	Equipotential busbar for EX zone 1/21, 2/22	5015265	1	
6	MK-B	Magnetic card and holder MK-B	5091322	10	
7	AF RD 10 V4A	Connection lug/earth entry rod made of stainless steel (V4A)	5430720	5	
8	isCon HWS	Information panel	5408058	1	



High-voltage-resistant, insulated conductor isCon®

Flat roof

	Type	Description	Item no.	Pack unit/m	Quantity
1	isFang 4000 AL	Insulated air-termination rod	5408943	1	
2	isCon AP1-16 VA	Connection plate for two isCon ® conductors	5408026	1	
3	565 7.6x380 SWUV	Cable tie, black, UV and weather-resistant	2331924	100	
4	927 2 6-K	Potential connection clip for mounting on isFang	5057599	10	
5	isFang 3B-100 AL	isFang air-termination rod stand	5408966	1	
+	isFang 3B-G1	isFang-3B threaded rod	5408971	3	
3x	F-FIX-S16	Concrete block for FangFix system 16 kg	5403227	1	
6	RK-FIX VA	Gutter clamp RK-FIX	5316459		
7	isCon H VA	VA cable bracket	5408056	50	
8	EX PAS 5	Equipotential busbar for EX zone 1/21, 2/22	5015265	1	
9	5052 V4A 30X3.5	Flat conductor, stainless steel	5018706	50	
10	isCon connect	Connection element	5408022	2	
11	isCon HWS	Information panel	5408058	1	

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The wind load describes how wind will affect the buildings and installations. It must be taken into account during planning.

Wind load
For decades, wind load has been an important consideration for OBO Bettermann in relation to external lightning protection. Today's calculation models and air-termination rod systems are the result of numerous studies and years of R&D experience.

The previous German standards in this area – DIN 1055:2005 Part 4: Wind loads and Part 5: Snow and ice loads, and DIN 4131: Steel antenna mounts – dealt with all load assumptions for mounts in Germany.

The eurocodes (EC) are the result of European standardisation in the construction field. EC 0 to EC 9 cover the documents in the series DIN EN 1990 to 1999. These are supplemented by the various national annexes (NA). The NAs contain provisions that go beyond the eurocode rules, i.e. the provisions that were previously part of the national standards.

Following the publication of the national annexes to the ECs, the old standards became invalid, following appropriate coexistence phases. (Table 2.8)

Old standard	New standard
DIN 1055:2005-03 Part 4: Wind loads	Eurocode 1: DIN EN 1991-1-4:2010-12: Parts 1-4: General effects; wind loads + DIN EN 1991-1-4/NA: 2010-12
DIN 1055:2005-03 Part 5: Snow and ice loads	DIN EN 1991-1-3: 2010-12 -; Parts 1-3: General effects; snow loads + DIN EN 1991-1-3/NA: 2010-12
DIN V 4131:2008-09 Steel antenna mounts	Eurocode 3: DIN EN 1993-3-1: 2010-12: Parts 3-1: Towers, masts and chimneys – Towers and masts + DIN EN 1993-3-1/NA: 2010-12

Table 1: Example: German national standards for the calculation of wind load

1st step: determining the wind zone
The second factor that needs to be known when determining the wind load is the wind load zone in which the object is located. (Table 2.9/Figure 2.21)

The standards contain no statements regarding the following aspects:
- Framework masts and towers with non-parallel main legs
- Guyed masts and chimneys
- Cable-stayed and suspension bridges
- Torsional vibrations

Figure 1: Wind zones in Germany according to DIN EN 1991-1-4 NA

Zone	Wind speed in m/s	Speed pressure in kN/m²
1	22.5	0.32
2	25.0	0.39
3	27.5	0.47
4	30.0	0.56

Table 2: Basic speeds and speed pressures

2nd step: determining the terrain category (TC)
Terrain-specific loads and dynamic pressures are an important element in calculating wind loads. (Table 3)

Terrain category (TC)	Definition
Terrain category I	Open sea; lakes with at least 5 km of open water in the wind direction; even, flat land without obstacles
Terrain category II	Terrain with hedges, individual farmsteads, buildings or trees, e.g. agricultural area
Terrain category III	Suburbs, industrial or commercial areas; forests
Terrain category IV	Urban areas in which at least 15% of the area is built up with buildings whose average height is higher than 15 m

Table 3: Terrain categories according to DIN EN 1991-1-4

3rd step: Determining the maximum gust speed

The tilt and slip resistance of air-termination rods must always be determined on a project-by-project basis. The reference height is the building height and two thirds of the length of the air-termination rod. The maximum gust speed at the project location must be determined.

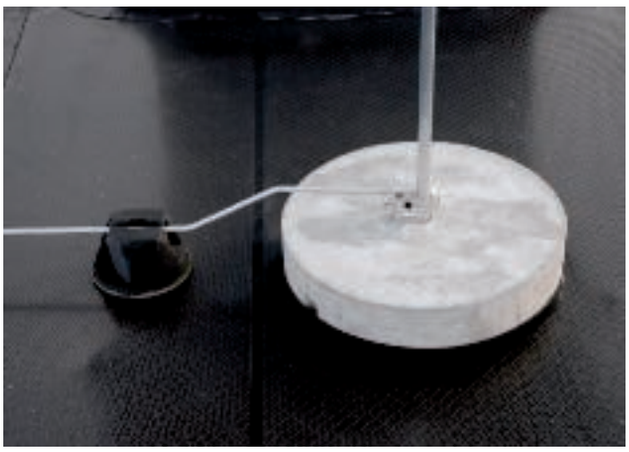

Figure 2: Air-termination rod with stand

Gust speed in wind zone I

Reference height in metres	TC I in kph	TC II in kph	TC III in kph	TC IV in kph
0	112	105	100	93
5	122	108	100	93
10	136	124	103	93
16	136	124	111	93
20	139	128	115	98
30	145	134	122	106
40	149	139	128	112
70	157	148	139	126
100	162	155	147	135

Table 4: Gust speeds, wind zone I

Gust speed in wind zone II

Reference height in metres	TC I in kph	TC II in kph	TC III in kph	TC IV in kph
0	124	117	111	104
5	136	120	111	104
10	145	131	114	104
16	152	138	123	104
20	155	142	127	109
30	161	149	136	118
40	165	154	142	125
70	174	165	155	139
100	180	172	163	150

Table 5: Gust speeds, wind zone II

Gust speed in wind zone III

Reference height in metres	TC I in kph	TC II in kph	TC III in kph	TC IV in kph
0	137	129	122	114
5	149	132	122	114
10	159	144	126	114
16	167	152	135	114
20	170	156	140	119
30	177	164	149	129
40	182	170	156	137
70	192	181	170	153
100	198	189	180	165

Table 6: Gust speeds, wind zone III

Gust speed in wind zone IV

Reference height in metres	TC I in kph	TC II in kph	TC III in kph	TC IV in kph
0	149	140	133	124
5	163	144	133	124
10	174	157	137	124
16	182	166	148	125
20	186	170	153	130
30	193	179	163	141
40	198	185	170	150
70	209	198	185	167
100	216	206	196	180

Table 7: Gust speeds, wind zone IV

4th step: Determining what concrete blocks are required

Based on the maximum gust speed, the number and size (10 or 16 kg) of concrete blocks required can be determined for the air-termination rod used. The value in the tables must lie above the maximum gust speed for the location.

An example

The maximum gust speed at the location is 142 km/h.

A tapered pipe air-termination rod of type 101 VL2500 and height 2.5 m is used.

Because the value in Table 6 must be higher than the maximum gust speed at the location (i.e. in this case more than 142 km/h), the next possible value is 164. Three concrete blocks, each of weight 16 kg, must therefore be used.

Number of concrete blocks for tapered pipe air-termination rods

Air-termination rod height in m	1.5	2	2.5	3	3.5	4	**Concrete blocks required**
Type	101 VL1500	101 VL2000	101 VL2500	101 VL3000	101 VL3500	101 VL4000	
Item no.	5401 98 0	5401 98 3	5401 98 6	5401 98 9	5401 99 3	5401 99 5	
Wind speed kph	117	-	-	-	-	-	**1 x 10 kg**
	164	120	95	-	-	-	**2 x 10 kg**
	165	122	96	-	-	-	**1 x 16 kg**
	-	170	135	111	95	-	**2 x 16 kg**
	-	208	164	136	116	102	**3 x 16 kg**

Number of concrete blocks for air-termination rod, one end rounded

Air-termination rod height in m	1	1.5	2	2.5	3	**Concrete blocks required**
Type	101 ALU-1000	101 ALU-1500	101 ALU-2000	101 ALU-2500	101 ALU-3000	
Item no.	5401 77 1	5401 80 1	5401 83 6	5401 85 2	5401 87 9	
Wind speed kph	97	-	-	-	-	**1 x 10 kg**
	196	133	103	-	-	**1 x 16 kg**
	-	186	143	117	100	**2 x 16 kg**
	-	-	173	142	121	**3 x 16 kg**

Number of concrete blocks for air-termination rod, one end rounded with connection strap

Air-termination rod height in m	1	1.5	**Concrete blocks required**
Type	101 A-L 100	101 A-L 150	
Item no.	5401 80 8	5401 85 9	
Wind speed kph	100	-	**1 x 10 kg**
	192	129	**1 x 16 kg**
	-	177	**2 x 16 kg**
	-	214	**3 x 16 kg**

Table 8: Number of OBO concrete blocks required

Number of concrete blocks for insulated VA and Al air -ermination rods

Air-termination rod height in m	4	6	4	6	**Concrete blocks required**
Material	VA	VA	Al	Al	
Item no.	5408 94 2	5408 94 6	5408 94 3	5408 94 7	
Item no. of appropriate interception rod stand	5408 96 8	5408 96 9	5408 96 6	5408 96 7	
Wind speed kph	120	94	120	92	**3 x 16 kg**
	161	122	163	122	**6 x 16 kg**
	194	145	197	147	**9 x 16 kg**
	222	165	227	168	**12 x 16 kg**
	246	182	252	187	**15 x 16 kg**

Number of concrete blocks for insulated air-termination rods with exit

Air-termination rod height in m	4	6	8	10	**Concrete blocks required**
Item no.	5408 93 8	5408 94 0	5408 88 8	5408 89 0	
Item no. of appropriate interception rod stand	5408 93 0	5408 93 2	5408 90 2	5408 90 2	
Wind speed kph	110	85	93	82	**3 x 16 kg**
	148	111	116	102	**6 x 16 kg**
	178	132	134	119	**9 x 16 kg**
	204	151	151	133	**12 x 16 kg**
	227	167	166	146	**15 x 16 kg**

Table 9: Number of OBO concrete blocks required for insulated air-termination rods

Number of concrete blocks for isFang air-termination rod with VA tripod

Air-termination rod height m	4	4.5	5.0	5.5	6.0	6.5	7.0	7.5	8.0	**Required concrete blocks**
Air-termination rod item no.	5402 86 4	5402 86 6	5402 86 8	5402 87 0	5402 87 2	5402 87 4	5402 87 6	5402 87 8	5402 88 0	
Matching Air-termination rod stand Item no.	5408 96 8	5408 96 8	5408 96 8	5408 96 8	5408 96 9	5408 96 9	5408 96 9	5408 96 9	5408 96 9	
Wind speed km/h	143	124	110	99	104	96	89	83	78	**3 x 16 kg**
	193	168	148	133	138	127	117	109	102	**6 x 16 kg**
	232	202	178	159	165	151	139	129	121	**9 x 16 kg**
	266	231	203	182	188	172	159	147	138	**12 x 16 kg**
	296	257	226	202	208	191	176	163	152	**15 x 16 kg**

Table 10: Number of OBO concrete blocks required for the isFang air-termination rod

Number of concrete blocks for isFang rod with Al tripod

Air-termination rod height in m	4	4,5	5,0	5,5	6,0	6,5	7,0	7,5	8,0	**Concrete blocks required**
Air-termination rod item no.	5402 86 4	5402 86 6	5402 86 8	5402 87 0	5402 87 2	5402 87 4	5402 87 6	5402 87 8	5402 88 0	
Appropriate Air-termination rod stand Item no.	5408 96 6	5408 96 6	5408 96 6	5408 96 6	5408 96 7	5408 96 7	5408 96 7	5408 96 7	5408 96 7	
Wind speed km/h	140	122	108	97	101	93	86	80	76	**3 x 16 kg**
	191	166	146	131	136	124	115	107	100	**6 x 16 kg**
	230	200	176	158	163	149	138	128	120	**9 x 16 kg**
	264	229	202	181	186	170	157	146	136	**12 x 16 kg**
	295	255	225	201	206	189	174	162	151	**15 x 16 kg**

Table 11: Number of OBO concrete blocks required for the isFang air-termination rod

Laboratory testing of lightning and surge protection components

In the BET testing centre, lightning and surge protection components, lightning protection structures and surge protection devices are put through their paces by highly qualified specialists in accordance with the relevant standards. In addition, the impact of events involving lightning is scientifically investigated.

The BET possesses a test generator for lightning current tests of up to 200 kA and a hybrid generator for surge current tests of up to 20 kV. Tasks performed include developmental tests of new developments and modifications to OBO surge protection devices according to the testing standard IEC 61643-11 (VDE 0675-6-11). The tests for lightning protection components are carried out according to IEC 62561-1 (DIN EN 62561-1) and those for spark gaps according to IEC 62561-3 (DIN EN 62561-3).

The hybrid generator is used for testing data cable protection devices in accordance with IEC 61643-21 (VDE 0845-3-1) "Surge protective devices connected to telecommunications and signalling networks".

The following standard-compliant tests can be carried out:

- Lightning protection components to EN 62561-1
- Spark gaps to EN 62561-3
- Lightning current meters to EN 62561-6
- Surge protection devices to EN 61643-11
- Data cable protection devices to EN 61643-21
- Environmental testing to EN ISO 9227 (neutral continuous salt spray testing)
- Environmental testing to EN 60068-2-52 (cyclical salt spray testing)
- Environmental testing to EN ISO 6988 (SO_2 toxic gas testing)
- IP protection rating to EN 60592
- Tensile strength to EN 10002-1

However, customer-specific requirements and tests not covered by standards can be tested up to the following parameters:

- Lightning current pulses (10/350) up to 200 kA, 100 As and 10 MA^2s
- Surge current pulses (8/20) up to 200 kA
- Combined surges (1.2/50) up to 20 kV
- Combined surges (10/700) up to 10 kV
- Follow current system 255 V, 50 Hz, up to 3 kA
- Insulation measurement up to 5 kV AC, 50 Hz and up to 6 kV DC
- Conductivity measurements up to 63 A, 50 Hz
- Tensile and compression strengths up to 100 kN

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Figure 3: BET test generator

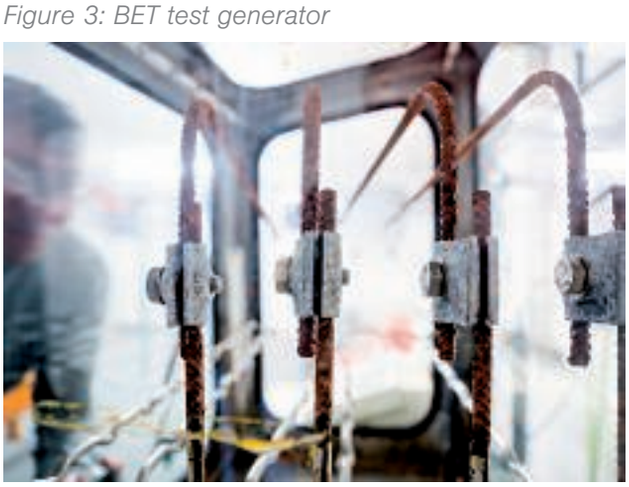

Figure 4: BET SO_2 testing system

Lightning protection guide. Safely routed.

Reference work and planning aid for electrical installation engineers and technical planners
At OBO Bettermann, we can look back on more than 90 years of experience in the field of lightning and surge protection. This experience and, of course, the latest standards and technical innovations have flowed into the company's new lightning protection guide. The brochure allows you to plan installations in the field of lightning and surge protection faster and more easily.

It contains a balanced mixture of basic knowledge and expert knowledge, as well as planning and selection aids for the protection of buildings and systems.

The new lightning protection guide can be requested by calling +49 (0)2373 89-1500 and is also available for download.

Topics

- Basic principles
- The external lightning protection system
- Air-termination and conductor systems
- Examples and selection aids for wind load calculation conform with Eurocode 1+3
- Earthing systems with foundation earther to current DIN 18014
- The internal lightning protection system
- Equipotential bonding systems
- Overvoltage protection systems
- Current standards
- New selection and planning aids
- Examples

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